



**Project: EASTERN DISTRIBUTOR, GROUNDWATER IMPACTS**  
**Hydrogeological analysis and modelling**

**Location: Mascot, Sydney, NSW**  
**Client: Leighton Contractors**

## **Highlights**

- Hydrogeological characterisation of Botany Sands
- Regional flow modelling
- Fine-scale modelling of drainage/dewatering works.

## **Background**

The motorway from Woolloomooloo to Sydney Airport includes an extended cutting through unconsolidated sediments (the Parkway) and a cut-and-cover tunnel (the Dacey-Todman Tunnel). The depth of the cutting necessitated evaluation of dewatering options and assessment of impacts that might arise from a reduction in the groundwater pressures in the surrounding area.

Leighton Contractors Ltd and Maunsell Pty Ltd commissioned C. M. Jewell & Associates Pty Ltd to undertake an assessment of groundwater conditions to support the engineering design.

## **Hydrogeological Environment**

The Parkway section was excavated within the upper part of the Botany Sands, which here comprises dune sands up to 15 metres thick. Beneath the dune sands lie alluvial and estuarine deposits, with variable proportions of soft peat and clay. The sands form a highly productive aquifer, from which industrial and irrigation abstraction is made. The unconfined aquifer is recharged by local precipitation excess and through-flow from up-gradient recharge zones, such as Moore Park.

## **Scope**

C. M. Jewell & Associates Pty Ltd initially undertook a desktop analysis of the problem. Groundwater modelling at a regional scale was then undertaken by Noel Merrick of the University of Technology, Sydney, using a refinement of a finite-element model originally developed for research purposes. Concurrently, drilling and pump testing for the derivation of aquifer properties, and a reinjection trial, were undertaken. The need for high model resolution led to the development of a local finite-difference groundwater flow model capable of simulating conditions close to the Parkway and the Dacey-Todman tunnel.

The final report included recommendations for dewatering system design, a groundwater level and quality monitoring program, and a contingency reinjection system design.